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Mechanical Properties of Hydrogel Beads KEELY CRIDDLE, THOMAS BENNS, DAN SHORTS, KLEBERT FEITOSA, James Madison University — Disordered dense packing of bubbles, droplets and grains form fragile solids that can withstand small stresses by virtue of system-wide force chains that lock the system into a jammed state. The nature of force chains in soft materials has been the subject of intense research, but despite much effort, a deep understanding of the jamming transition remains elusive. In this experiment we study the mechanical properties of hydrogel beads to explore these particles as force chain transducers in densely packed systems. The experiment consists of uniaxial compression of hydrogel beads under a known force, measuring the strain and the radius of the contact area of the bead. A linear relationship exists between the contact radius and the strain, and two separate regimes determine the relationship between the force and the strain. Using the relationships found, a universal power law is being determined to describe the force as a function of the contact radius of the beads.

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